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Research Article

Information Technology and Pricing: Introduction to the Special Section*

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* The two papers presented in the current issue are independent research papers. We bundled them together to open up a discourse around the pricing issue. Professor Rob Kauffman kindly provided an editorial introduction.

Information Technology and Pricing: Introduction to the Special Section

Information technology (IT) has given rise to a new spectrum of pricing issues for consumers, firms, industries, and the economy, as well as an interesting array of pricing strategy choices for firms that offer goods and services in physical stores and via the Internet. Researchers in the field of information systems (IS) have increasingly recognized the importance of studying how pricing-related issues and firm-level pricing strategies have been changing in the presence of rapidly evolving technological capabilities. Researchers in the marketing discipline have recently begun to view IT as central to the production process for prices within the firm. This opens up a new domain for research in the IS area, and an opportunity to make interdisciplinary contributions involving new theory, innovative research methods, and new empirical results and managerial insights. The relevant applied contexts include pure Internet-based selling in e-commerce, bricks-and-clicks business models, and other dynamic pricing mechanisms. They also extend to electronic auctions, group discounting, and new e-coupon-based selling schemes. This special section includes two new articles that address a subset of these new pricing issues in the presence of IT: the impact of IT on price rigidity, and effective strategies for pricing information services in the marketplace.

The first article discusses "A Multi-Level Theory Approach to Understanding Price Rigidity in Internet Retailing," by Robert J. Kauffman and Dongwon Lee. The authors define *price rigidity* as "prices that do not change with the regularity predicted by theory." Price rigidity is of special interest to IS researchers in the e-commerce context, where many observers believe that IT has had fundamental impacts that have changed the manner in which business is conducted. The authors observe, however, that we should not reach any strong conclusions about price rigidity and price flexibility in the Internet economy without due consideration of existing theory. They advocate the application of a multi-level, multi-theoretical perspective to understand the role of: (1) price adjustment costs, non-price competition, and demand and inventory effects at the *firm-specific level*; (2) contracts, information asymmetries, and psychological price points at the *firm-to-consumer level*; and (3) industry concentration and firm coordination effects at the *firm-to-market-level*. Through a wide-ranging analysis of the relevant literature in marketing, economics, consumer psychology, and IS, the authors conclude that there "should not be less price rigidity in Internet retailing than in traditional retailing – even though the Internet is involved." This is an interesting and counter-intuitive result, since many well-informed observers associate pricing strategy in Internet-based selling with algorithmic pricing, revenue yield management, much lower costs of prices changes in e-commerce than in traditional commerce, and to-the-penny search capabilities.

The authors contribute new knowledge about the settings and circumstances under which different theoretical perspectives lead to different predictions of observed price-change behavior. They call this a *multi-level variance theory of Internet-based price rigidity*. It turns out that, irrespective of analysis level that is evaluated, there are strong and persuasive theoretical reasons why prices should be more rigid than purely technological considerations for making price changes would suggest in e-commerce. To drive these findings home, the authors also conduct a meta-analysis of how prior empirical research findings relate to pricing in a variety of e-commerce settings dovetail with the theoretical predictions they have distilled for firm behavior with respect to price changes. This article will be a must-read for doctoral students who are interested in developing background on IT and pricing, as well as for experienced IS, economics, and marketing researchers who are interested in gaining a more sophisticated understanding and new research knowledge using multi-level theoretical perspectives.

The second article, by Shin-Yi Wu and Rajiv D. Banker, is entitled "Best Pricing Strategy for Information Services." Using economic theory and analysis methods, the authors evaluate the strategic effectiveness of different pricing schemes for monopolist firms that provide some form of information services. These kinds of firms include Facebook, Twitter, MySpace, and Second Life, among many others. Such firms offer information services that are unique in some way, and as a result, will be able to develop their own customer base. In the short term, competitors cannot replicate the services that such firms make available. This makes it possible to view these firms as monopoly service providers. The authors model three different pricing schemes: flat-fee pricing, usage-based pricing, and two-part tariff pricing. In their analysis, Wu and Banker assess the impact of homogeneous demand among consumers, as well as heterogeneous maximum consumption levels,

on pricing scheme choice. They also treat different settings in which the information service provider has zero or positive marginal costs, and zero or positive monitoring costs for their customers' consumption. The authors' theoretical findings extend what we know about the strategic pricing of information services in several ways. They show that flat-fee pricing and two-part tariff pricing perform equally well and better than usage-based pricing for homogeneous willingness-to-pay consumers. They obtain the same finding when consumers have somewhat different downward-sloping demand curves. In contrast, however, when consumers exhibit more heterogeneous consumption levels, then two-part tariff pricing dominates flat-fee pricing and usage-based pricing in terms of the level of profit it yields for the information service provider.

One of the central imperatives associated with advanced IT is that it is becoming possible for information service providers to drive their marginal costs of production and their monitoring costs for their consumers' consumption of their service offerings toward zero. Thus, a further element of interest in the authors' analytical findings comes with their assessment of the relative sensitivity of a selected information services pricing scheme. With consumers of similar or different marginal willingness-to-pay levels, flat-fee pricing for information services will be preferred to the other schemes when the monitoring costs for usage and the marginal costs of production are both positive and sum to less than a criterion level. Although the authors never attempt to model a competitive market setting for the pricing of information services, one can hardly fault their choice: their work on monopoly market structures does much to convince us to recognize the value of modeling simpler settings where it still is possible to deliver rich and insightful new theoretical and managerial knowledge.

Going beyond the research that we have showcased in this special section, there are a number of other frontiers for research in the IS discipline that may be especially appealing to those who are interested in technology-driven and technology-enabled pricing phenomena. One lies in the area of pricing strategy formulation for offering digital contents and digital services in mobile computing and location-based systems. Mobile phone systems and other mobile computing environments now have the capacity to offer consumers historically larger amounts of information than ever before. They simultaneously make it possible for the suppliers of products and services to achieve unique levels of informedness about how consumers are reacting to their offerings – prices included. This will create the underlying conditions for the further "financification" of strategic pricing and revenue yield management at the mobile device level, a new hub for business intelligence and information exchange between consumers and sellers. This will open up the possibility for dramatic disaggregation of strategic pricing policy based on the discovery of information by the seller at the device level, precisely where a consumer uses it – another important opportunity for IS research. Some current examples illustrate this well. One example is booking a table and a time for dinner at a restaurant via OpenTable (www.opentable.com), or Urban Spoon (www.urbanspoon.com). Another is reserving best-price airfares and itineraries via Kayak (www.kayak.com), or with information from the fare prediction engines from Bing's Farecast (www.bing.com/travel) and FlySpy (www.flyspy.com). Still another is identifying openings at specific time slots for car repairs at conveniently located and reputable auto mechanics shops, beyond the current online location search capabilities of firms such as Midas (www.midas.com) or JiffyLube (www.jiffylube.com).

Extending this view to ubiquitous computing environments, it is worthwhile to observe that consumers seem to be showing increasing levels of willingness-to-pay for information when and where they need it. Current research in IS has come to recognize the importance of consumer and supplier informedness, but still has yet to fully appreciate how to craft "next generation" pricing strategies that will provide the greatest value for all of the involved parties. Another related direction for new research will be to explore how emerging technologies tend to transform consumer willingness-to-pay, and the effects of such changes on firm pricing strategy formulation.

Consider the following compelling example. We are entering an era in which biomedical information sensing and sharing services will be available to support the provision of healthcare services. People will increasingly become bio-networked to their healthcare providers, because this will become possible technologically and is likely to diminish the cost of providing healthcare services to high-risk individuals (people who suffer from heart problems, diabetes, and other organ problems). This is a

new context for which the pricing of different kinds of variable information bundles (heart rate, blood pressure, temperature, toxin sensing, medication tracking) is likely to become prominent and vital to preventive medical services.

Upstart ubiquitous computing technology companies like FullPower Technologies (www.fullpower.com), a leader in mobile sensing technologies, are beginning to operate in this area. FullPower, led by the visionary technology entrepreneur Phillippe Kahn, is a successor to LightSurf (for digital camera phone technology), Starfish (for push technology, and wireless and wired telecommunications services integration), and Borland (for Sidekick, Quattro Pro and Paradox software tools). Companies like this always seem to change the market with their technological innovations in ways that ultimately relate to strategic pricing issues. In this case, Kahn's entrepreneurship led to the emergence of pricing for cell phone data transmission for sending family photographs, pricing combined wireless and wired phone services, and pricing bundles of complementary software products prior to Windows Office.

Although it always is difficult to see the future amidst the complexity of current developments, ubiquitous computing technology innovations are sure to change how companies will formulate their prices and how consumers will react to them. Conducting case study research on innovative firms and watching out for relevant new technologies that will change the market equilibrium for information exchange between consumers and suppliers are important activities. Such efforts will enable IS researchers to keep their thumbs on the pulse of technology-driven pricing strategy changes.

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